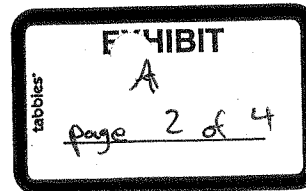


Alan Conley
Type: Regular



Mehrdad Pirouz

Employee has left Cisco.

Background: The End to End Performance Tool is used to distinguish performance bottlenecks for select customers. This tool gives objective end-to-end performance metrics of CCO customers' E-commerce transactions. It tracks two measurements: (1) the Internet delay from selected CCO customers' sites to Cisco, and (2) the IPC (e-commerce) Application delay, and presents this data over time.

This tool is designed to help identify the exact nature of the response time latency. Currently, the IPCJ-OT (New Ordering Tool) application is being monitored with this tool. However, many applications can be added to this tool and can be used in the same way.

To our knowledge, there is no tool that is designed to monitor and accurately identify customers' performance latencies. The End to End Monitoring tool monitors and represents customers both by customer name and by theater. This tool is unique in that we can offer our customers additional information about the exact location of their performance delays. This information is highly valuable because we can pinpoint the time, nature, and location of application vs. Internet latencies. This information is, ultimately, going to be used to help identify solutions and improve overall customer experience for our customers.

Possible Prior Art: ---

Summary: The End to End Performance Tool is used to distinguish performance bottlenecks for select customers. This tool gives objective end-to-end performance metrics of CCO customers' E-commerce transactions. It tracks two measurements:
(1) the Internet delay from selected CCO customers' sites to Cisco, and the
(2) Ordering Tool (E-commerce) Application delay

This data is presented over time. Data is kept on a four week rolling average for network latency from CCO to the customer-provided URL and for the internal application being monitored.

The E2E Tool determines connectivity to the configured customer sites by using a "HTTP HEAD" request to their web server. Alternatively, it may use a simple ICMP "ping" to their site.

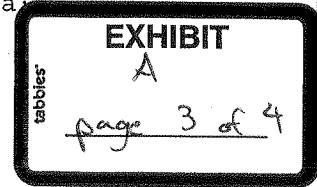
This monitoring is performed by the standard EMAN application monitor, and is thus has a configurable polling rate and timeout criteria. (Typically sites are polled once every 30 seconds)

Since both the internet and the CCO servers experience load which varies depending on the time of day and day of week, direct comparison of performance of the network or application's absolute response time is not necessarily useful. This tool therefore develops baselines over a period of weeks to characterize what response time is typical for a particular time of day and time of week. It then compares measured response times against these baseline values and allows users to see periods of both poor performance (absolute response time) and unusually poor performance (response time as a percentage of the baseline for that time of day and day of week).

The ability to combine absolute measurement of CCO application performance and of network performance between Cisco and its customers against typical values (baselines) is key to the usefulness of this tool. This ability sets it apart from simple network availability monitoring by enabling users to, at a glance, differentiate "normal" behavior from "abnormal" behavior.

The second phase of the End to End tool includes an automated traceroute facility. This performs and stores traceroutes in addition to the existing HTTP and ICMP monitoring and stores these traceroutes in a database for later retrieval. This traceroute data is encoded and ranked based upon several criteria:

1. Hop Count
2. Total RTT for all Hops
3. Maximum RTT for any Hop
4. RTT of the last hop
5. Sum of the absolute deviations of the RTTs for each hop
6. Number of "errors" (no response, host unreachable, etc)
7. "Traceroute Index" (This is a value which is computed as a weighted product of several of the other metrics and is intended to be a numeric indicator of the "goodness" of a particular traceroute as compared to others to this same destination host. It is a relative measure only.



This data is then linked into the existing response time graphs such that the user may click on the graph to view the closest traceroute to that point in time. This is intended as a method for users to identify the cause of the degradation which was measured at that time. Traceroutes may be graphed based upon the numeric values mentioned above and they may be viewed in detail to show all hops and their response times.

Traceroutes are also baselined based upon the "traceroute index" mentioned above so that a "representative worst and best case" traceroute is available for each baselining interval throughout the week. This is a valuable tool for identifying in what way a particular period of poor performance is different from one of good performance.

Restatement: ---

Advantages:

This solution can not only detect response time latencies, but it can also identify the exact location of the performance latency. This data is presented over time. Data is kept on a four week rolling average for network latency from CCO to the customer-provided URL and for the internal application being monitored.

An easy-to-interpret graphical representation shows us whether the Internet connection to the customer, or the Application, was performing unusually poorly or well at any given time. It highlights a difference from the norm, and allows you to determine whether the Internet connection, or the Application, or both, were performing unusually worse or better than expected at any given time. Once a problem period is identified, the data may be viewed in several other ways (absolute network and performance response times, times vs. the baselines, and traceroute data) which help in identifying the cause of poor performance for a particular customer.

Additionally, no client or monitoring agent installation is required on the customer's computer, server or network. Performance is monitored with the customers' complete permission/collaboration and, therefore, the level of imposition on the customer is very minimal.

First Written Record URLs: ---

Cisco Use:

---This tool gives objective end-to-end performance metrics of CCO customers' E-commerce transactions. The tool is designed to help Customer Service Tier 1 and 2 support people to identify the source of a customer's CCO problem when a customer has called in with an inquiry or complaint. Future priorities include having a secured version of the tool available to all Tier 1 Customer Service representatives. This secured version would be an easy-to-interpret representation of whether the problem is an application or Internet issue. This will be highly beneficial because customer representatives can immediately respond to our customers' inquiries. This will not only reduce costs by

reducing the numbers of calls that are escalated to Tier 2 and Tier 3 support, but it will also increase customer satisfaction.

Working Model: -----

Industry Use: Description of possible uses of the technology by others in the industry:

Public Use: ---The product has not been offered for sale or used outside of Cisco. We have used this tool for select customers, but only the core End to End team has used this tool.

Government Use: ---

Detecting Use: Cisco can regularly review publicly available solutions to determine if similar features are offered. Customer reports of similar offerings from other companies may offer visibility into those proprietary solutions.

Standards: ---

Technologies:

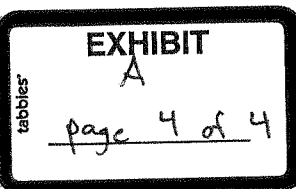
- IP > IP Application Services
- Quality of Service (QoS) > QoS Congestion Management (queueing)

Networking Solutions:

- Large Enterprise > Networking Solutions for Large Enterprise > Network Management Solutions for Large Enterprise
- Large Enterprise > Networking Solutions for Large Enterprise > Content Networking Solutions for Large Enterprise

Categorization Notes:

Categories Summary
[CO] [IN] [NM/NA]



PDDs: ---

Supporting Documents:

• ---

Documents:

Notes: Please contact our team for additional documentation, project plans, presentations, and any other information on this tool.

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